Outdoor Heat Pump

User's Information/Installation Instructions

13 SEER R-410A High Efficiency Split System

These units have been designed and tested for capacity and efficiency in accordance with A.R.I. Standards. Split System Heat Pump units are designed for use with a wide variety of fossil fuel furnaces, electric furnaces, air handlers, and evaporator coil combinations.

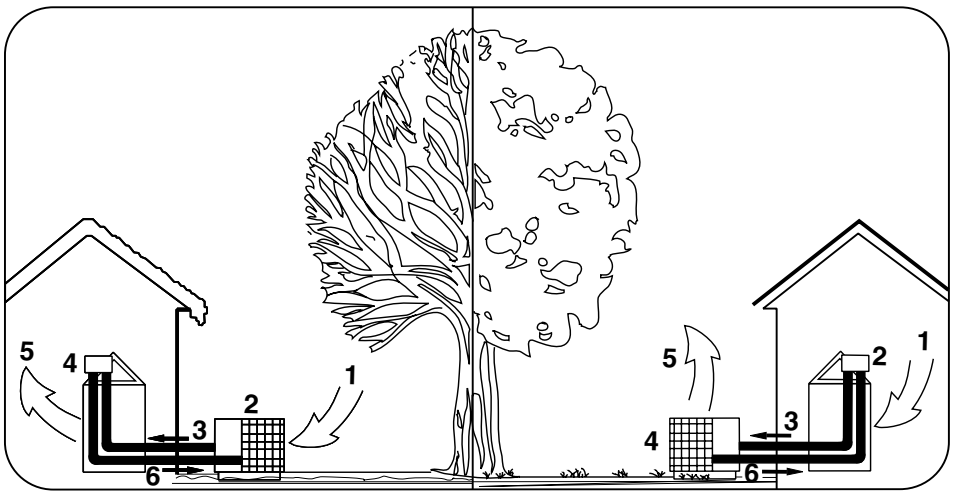
These instructions are primarily intended to assist qualified individuals experienced in the proper installation of heating and/or air conditioning appliances. Some local codes require licensed installation/service personnel for this type of equipment. Read all instructions carefully before starting the installation.

USER'S INFORMATION

IMPORTANT

Read this owner information to become familiar with the capabilities and use of your appliance. Keep this with literature on other appliances where you have easy access to it in the future. If a problem occurs, check the instructions and follow recommendations given. If these suggestions don't eliminate your problem, call your servicing contractor.

Heat Pump Principle of Operation



WINTER HEATING

1. Outdoor air enters heat pump.
2. Cold, heat-transfer section (outdoor coil) extracts heat from outdoor air as refrigerant evaporates from a liquid to a gas.
3. Refrigerant, compressed to a hot gas by heat pump, carries the heat to the hot heat-transfer section (indoor coil).
4. Hot, heat-transfer section (indoor coil) releases the heat to indoor air as refrigerant condenses from a gas to a liquid.
5. Air handler circulates the heat throughout the home.
6. Refrigerant returns to outdoor coil and evaporates once again to absorb more heat.

SUMMER COOLING

1. Indoor air enters the air handler section.
2. Cold, heat-transfer section (indoor coil) extracts heat from indoor air as refrigerant evaporates from a liquid to a cold gas.
3. Refrigerant, drawn to heat pump and compressed to a hot gas by heat pump, carries the heat outdoors.
4. Hot, heat-transfer section (outdoor coil) releases the heat as refrigerant condenses from a gas to a liquid.
5. Heat pump (outdoor fan) discharges the heat to outside air.
6. Refrigerant returns to indoor coil and evaporates once again to absorb more heat.

OPERATING INSTRUCTIONS

TO OPERATE YOUR HEAT PUMP FOR COOLING —

1. Set the thermostat system switch to COOL and the thermostat fan switch to AUTO. **(See Figure 1)**

2. Set the thermostat temperature to the desired temperature level using the temperature selector. Please refer to the separate detailed thermostat user's manual for complete instructions regarding thermostat programming. The outdoor unit and indoor blower will both cycle on and off to maintain the indoor temperature at the desired cooling level.

   NOTE: If the thermostat temperature level is re-adjusted, or the thermostat system switch is repositioned, the outdoor unit may not start immediately. The outdoor unit contains a protective timer circuit which holds the unit off for approximately five minutes following a previous operation, or the interruption of the main electrical power.

TO OPERATE YOUR HEAT PUMP FOR HEATING —

1. Set the thermostat system switch to HEAT and the thermostat fan switch to AUTO. **(See Figure 1)**

2. Set the thermostat temperature to the desired temperature level using the temperature selector. Please refer to the separate detailed thermostat user's manual for complete instructions regarding thermostat programming. The outdoor unit and indoor blower will both cycle on and off to maintain the indoor temperature at the desired heating level.

   NOTE: If the thermostat temperature level is re-adjusted, or the thermostat system switch is repositioned, the outdoor unit may not start immediately. The outdoor unit contains a protective timer circuit which holds the unit off for approximately five minutes following a previous operation, or the interruption of the main electrical power.

   Emergency Heat:

   The thermostat includes a system switch position termed EM. HT. This is a back-up heating mode to be used only if there is a suspected problem with the outdoor unit. With the system switch set to EM. HT. the outdoor unit will be locked off, and supplemental heat (typically electric resistance heating) will be used as a source of heat. Sustained use of electric resistance heat in place of the heat pump will result in an increase in electric utility costs.

   Defrost:

   During cold weather heating operation, the outdoor unit will develop a coating

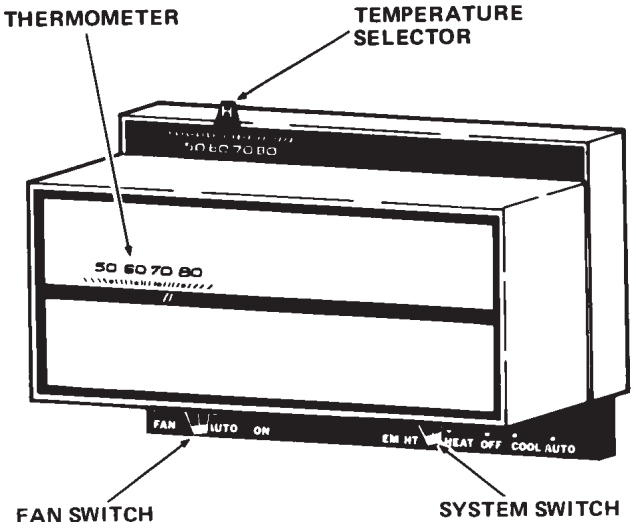


Figure 1. Typical Thermostat

of snow and ice on the heat transfer coil. This is normal, and the unit will periodically defrost itself. During the defrost cycle, the outdoor fan will stop, and the compressor will continue to run and heat the outdoor coil, causing the snow and ice to melt. After the snow and ice have melted, some steam may rise from the outdoor unit as the warm coil causes some melted frost to evaporate.

TO OPERATE YOUR HEAT PUMP FOR AUTOMATIC COOLING AND HEATING —

1. Set the thermostat system switch to AUTO and the thermostat fan switch to AUTO. **(See Figure 1)**

   Note: Thermostats will vary. Some models will not include the AUTO mode, and others will have the AUTO in place of the HEAT and COOL, and some will include all three.

2. Set the thermostat temperature to the desired heating and cooling temperature level(s). The outdoor unit and the indoor blower will then cycle on and off in either the heating or cooling mode of operation as required to automatically maintain the indoor temperature within the desired limits.

TO SHUT OFF YOUR HEAT PUMP —

Set the thermostat system switch to OFF and the thermostat fan switch to AUTO. **(See Figure 1)** The system will not operate, regardless of the thermostat temperature selector(s) setting.

TO OPERATE THE INDOOR BLOWER CONTINUOUSLY —

Set the thermostat fan switch to ON **(See Figure 1)**. The indoor blower will start immediately, and will run continually until the fan switch is reset to AUTO.

The continuous indoor blower operation can be obtained with the thermostat system switch set in any position, including OFF.

The continuous indoor blower operation is typically used to circulate the indoor air to equalize a temperature unbalance due to a sun load, cooking, or fireplace operation.

TO MAINTAIN YOUR HEAT PUMP —

⚠ CAUTION:

Be certain the electrical power to the outdoor unit and the furnace/air handler is disconnected before doing the following recommended maintenance.

1. Regularly:

a. Clean or replace the indoor air filter at the start of each heating and cooling season, and when an accumulation of dust and dirt is visible on the air filter. Inspect the filter monthly.

b. Remove any leaves and grass clippings from the coil in the outdoor unit, being careful not to damage the aluminum fins.

c. Check for any obstruction such as twigs, sticks, etc.

⚠ CAUTION:

Do not over-oil, or oil motors not factory-equipped with oil tubes. The compressor is hermetically "sealed" and does not require lubrication.

2. Before Calling a Service Technician, Be Certain:

a. The unit thermostat is properly set — see "To Operate Your Heat Pump for Cooling" and "To Operate Your Heat Pump for Heating."

b. The unit disconnect fuses are in good condition, and the electrical power to the unit is turned on.

Read Your Warranty

Please read the separate warranty document completely. It contains valuable information about your system.

GENERAL INFORMATION

Read the following instructions completely before performing the installation.

⚠ CAUTION:

This unit uses refrigerant R-410A. DO NOT under any circumstances use any other refrigerant besides R-410A in this unit. Use of another refrigerant will damage this unit.

Outdoor Unit Section — Each outdoor unit is shipped with a refrigerant charge adequate to operate the outdoor section with an indoor matching coil or air handler. Units with braze connections include the proper amount of refrigerant for an additional 15 ft. of refrigerant lines the same size as the valve fittings.

NOTE: DO NOT USE ANY PORTION OF THE CHARGE FOR PURGING OR LEAK TESTING.

Matching coils and air handlers may be shipped with a small holding charge to pressurize them to keep out contaminants. To release the pressure, read the indoor section installation instructions carefully.

Liquid and Suction Lines — Fully annealed, refrigerant grade copper tubing should be used when installing the system. Refrigerant suction line tubing should be fully insulated.

Field Connections for Electrical Power Supply — All wiring must comply with current provisions of the "National Electrical Code" (ANSI/NFPA 70) and with applicable local codes having jurisdiction. The minimum size of electrical conductors and circuit protection must be in compliance with information listed on the outdoor unit data label.

NOTICE:

Certain models have external panels fabricated from a premium grade of stainless steel designed to inhibit corrosion. For such units, if the unit is located in a coastal region or other area subjected to high concentrations of salt, then the unit should be hosed off after stroms and monthly otherwise to maintain its new appearance.

SAFETY CONSIDERATIONS

Pressures within the System — Split system heat pump equipment contains liquid and gaseous refrigerant under pressure. Installation and servicing of this equipment should be accomplished by qualified, trained personnel thoroughly familiar with this type of equipment. Under no circumstances should the Homeowner attempt to install and/or service the equipment.

Labels, Tags, Precautions — When working with this equipment, follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.

Brazing Operations — Installation of equipment may require brazing operations. Safety codes must be complied with. Safety equipment (e.g.; safety glasses, work gloves, fire extinguisher, etc.) must be used when performing brazing operations.

⚠ WARNING:

Ensure all electrical power to the unit is off prior to installing or servicing the equipment. Failure to do so may cause personal injury or death.

SITE PREPARATION

Unpacking Equipment — Remove the cardboard carton and User's Manual from the equipment. Take care to not damage tubing connections when removing from the carton.

Inspect for Damage — Inspect the equipment for damage prior to installing the equipment at the job site. Ensure coil fins are straight and, if necessary, comb fins to remove flattened and bent fins.

Preferred Location of the Outdoor Unit at the Job Site — Conduct a survey of the job site to determine the optimum location for mounting the outdoor unit. Overhead obstructions, poorly ventilated areas, and areas subject to accumulation of debris should be avoided. The

outdoor unit must be installed in such a manner that airflow through the coil is not obstructed and that the unit can be serviced.

Facility Prerequisites — Electrical power supplied must be adequate for proper operation of the equipment. The system must be wired and provided with circuit protection in accordance with local building codes and the National Electrical Code.

INSTALLING THE OUTDOOR UNIT

Slab Mount — The site selected for a slab mount installation requires a stable foundation and one not subject to erosion. The slab should be level and anchored (if necessary) prior to placing the equipment on the slab.

Cantilever Mount — The cantilever mount should be designed with adequate safety factor to support the weight of the equipment, and for loads subjected to the mount during operation. Installed equipment should be adequately secured to the cantilever mount and levelled prior to operation of the equipment.

Roof Mount — The method of mounting should be designed so as not to overload roof structures nor transmit noise to the interior of the structure. Refrigerant and electrical line should be routed through suitably waterproofed openings to prevent water leaking into the structure.

INSTALLING THE INDOOR UNIT

The indoor section should be installed before proceeding with routing of refrigerant piping. Consult the Installation Instructions of the indoor unit (i.e.: air handler, furnace, etc.) for details regarding installation.

CONNECTING REFRIGERANT TUBING BETWEEN THE INDOOR AND OUTDOOR UNIT

⚠ CAUTION:

This system utilizes R-410A refrigerant with POE oil. When servicing, cover or seal openings to minimize the exposure of the refrigerant system to air to prevent accumulation of moisture and other contaminants.

General — Once outdoor and indoor unit placement has been determined, route refrigerant tubing between the equipment in accordance with sound installation practices. Refrigerant tubing should be routed in a manner that minimizes the length of tubing and the number of bends in the tubing. Refrigerant tubing should be supported in a manner that the tubing will not vibrate or abrade during system operation. Tubing should be kept clean of foreign debris during installation and installation of a liquid line filter drier is recommended if cleanliness or adequacy of system evacuation is unknown or compromised. Every effort should be made by the installer to ensure that the field installed, refrigerant containing components of the system have been installed in accordance with these instructions and sound installation practices so as to insure reliable system operation and longevity.

The maximum recommended interconnecting refrigerant line length is 75 feet, and the vertical elevation difference between the indoor and outdoor sections should not exceed 20 feet. Consult long line application guide for installations in excess of these limits.

Filter Dryer Installation — A filter dryer is provided with the unit and must be installed in the liquid line of the system. If the installation replaces a system with a filter dryer already present in the liquid line, the filter dryer must be replaced with the one supplied with the unit. The filter dryer must be installed in strict accordance with the manufacturer's installation instructions.

Optional Equipment — Optional equipment (e.g.: liquid line solenoid valves, etc.) should be installed in strict accordance with the manufacturer's installation instructions.

ELECTRICAL CONNECTIONS

⚠ WARNING:

Turn off all electrical power at the main circuit box before wiring electrical power to the outdoor unit. Failure to comply may cause severe personnel injury or death.

Wiring Diagram/Schematic — A wiring diagram/schematic is located on the inside cover of the electrical box of the outdoor unit. The installer should become familiar with the wiring diagram/schematic before making any electrical connections to the outdoor unit.

Outdoor Unit Connections — The outdoor unit requires both power and control circuit electrical connections. Refer to the unit wiring diagram/schematic for identification and location of outdoor unit field wiring interfaces.

Control Circuit Wiring — The outdoor unit is designed to operate from a 24 VAC Class II control circuit. Control circuit wiring must comply with the current provisions of the "National Electrical Code" (ANSI/NFPA 70) and with applicable local codes having jurisdiction.

Thermostat connections should be made in accordance with the instructions supplied with the thermostat, and with the instructions supplied with the indoor equipment. A typical residential installation with a heat pump thermostat and air handler are shown below.

Electrical Power Wiring — Electrical power wiring must comply with the current provisions of the "National Electrical Code" (ANSI/NFPA 70) and with applicable local codes having jurisdiction. Use of rain tight conduit is recommended. Electrical conductors shall have minimum circuit ampacity in compliance with the outdoor unit rating label. The facility shall employ electrical circuit protection at a current rating no greater than that indicated on the outdoor unit rating label. Refer to the unit wiring diagram for connection details.

Minimum Circuit Ampacity — Electrical wiring to the equipment must be compatible and in compliance with the minimum circuit ampacity listed on the outdoor unit data label.

COPPER WIRE SIZE — AWG (1% Voltage Drop)				
Supply Wire Length-Feet				Supply Circuit
200	150	100	50	Ampacity
6	8	10	14	15
4	6	8	12	20
4	6	8	10	25
4	4	6	10	30
3	4	6	8	35
3	4	6	8	40
2	3	4	6	45
2	3	4	6	50

Wire Size based on N.E.C. for 60° type copper conductors.

Maximum Fuse/Circuit Breaker Size — Circuit protection for the outdoor unit must be compatible with the maximum fuse/circuit breaker size listed on the outdoor unit data label.

Disconnect Switch — An electrically compatible disconnect switch must be within line of sight of the outdoor unit. This switch shall be capable of electrically de-energizing the outdoor unit.

Optional Equipment — Optional equipment requiring connection to the power or control circuits must be wired in strict accordance with current provisions of the "National Electrical Code" (ANSI/NFPA 70), with applicable local codes having jurisdiction, and the installation instructions provided with the equipment. Optional Equipment (e.g.: liquid line solenoid valves, hard start kits, low suction pressure cutout switch kit, high pressure cutout switch kit, refrigerant compressor crankcase heater, etc.) should be installed in strict accordance with the manufacturer's installation instructions.

STARTUP AND CHECKOUT

⚠ WARNING:

Ensure electrical power to the unit is off prior to performing the following steps. Failure to do so may cause personal injury or death.

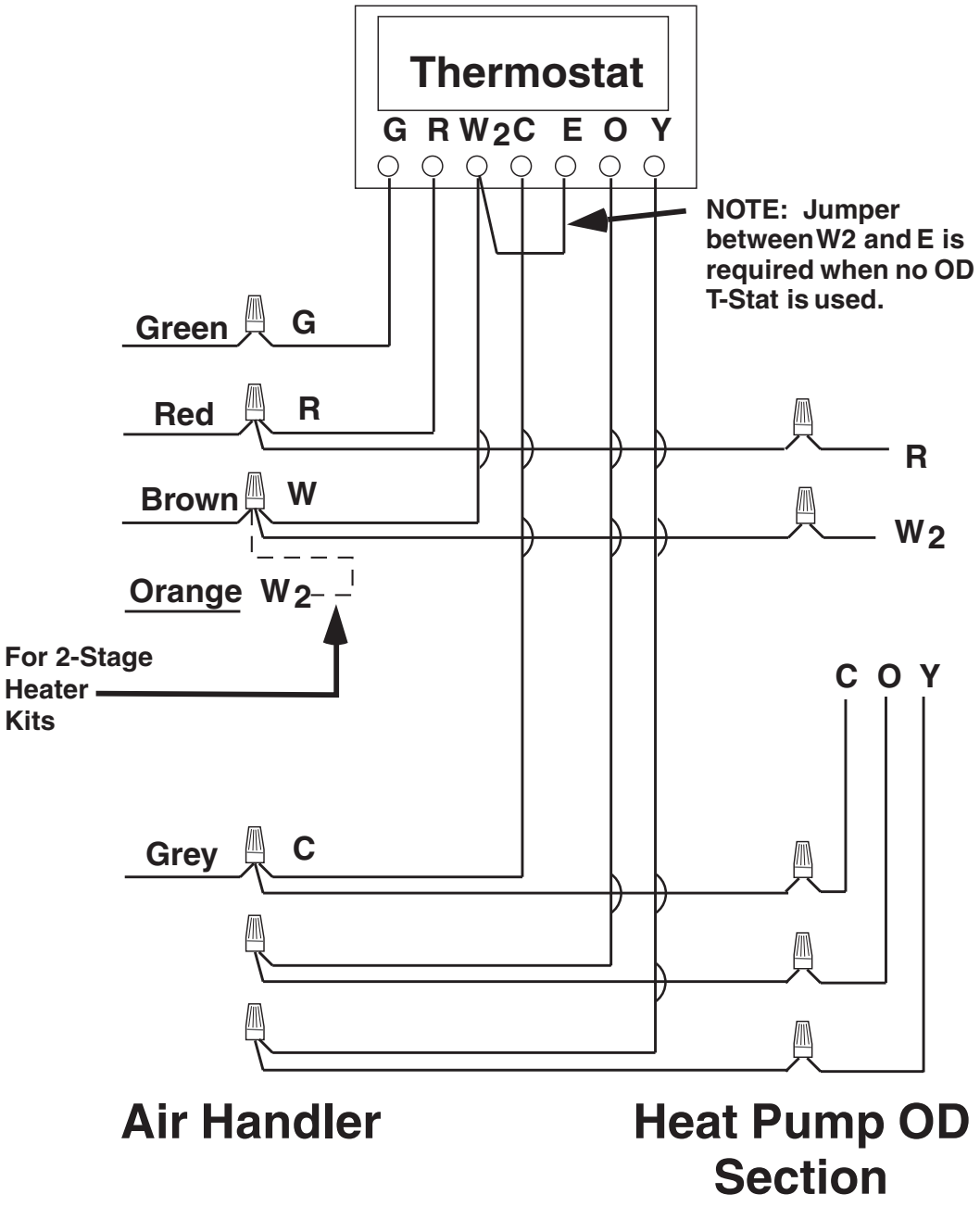
Air Filters — Ensure air filters are clean and in place prior to operating the equipment.

Thermostat — Set the room thermostat function switch to OFF, fan switch to AUTO, and adjust the temperature setpoint to its highest setting.

Prior to applying electrical power to the outdoor unit, ensure that the unit has been properly and securely grounded, and that power supply connections have been made at both the facility power interface and outdoor unit.

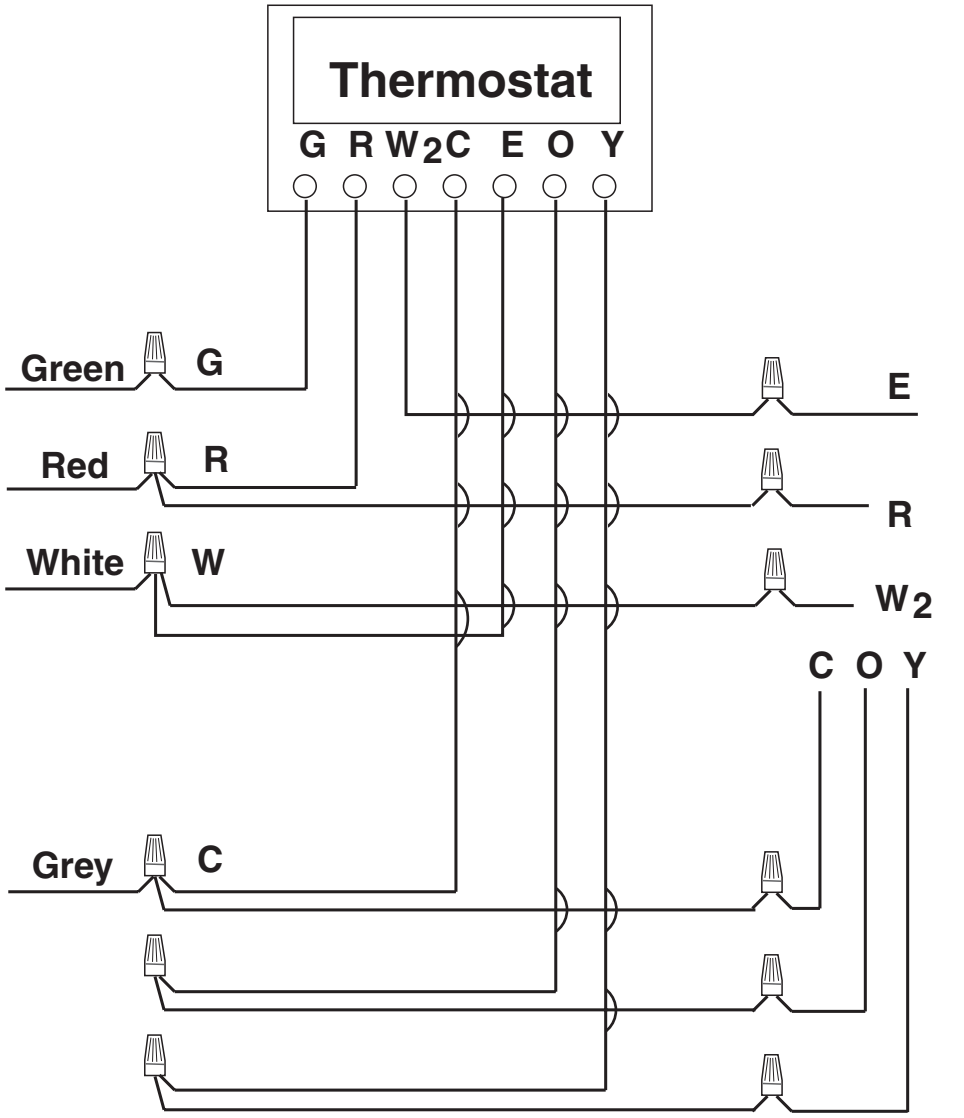
Outdoor Unit — Ensure the outdoor coil and top of the unit are free from obstructions and debris, and all equipment access/control panels are in place.

Using extreme caution, apply power to the unit and inspect the wiring for evidence of open, shorted, and/or improperly wired circuits.



Typical Heat Pump with Standard Air Handler

A typical installation with a heat pump thermostat, air handler, and heat pump with an outdoor thermostat.



Typical Heat Pump with Outdoor Thermostat and Air Handler

Functional Checkout:

⚠ CAUTION:

If equipped with a compressor crankcase heater, wait 24 hours prior to performing a function checkout to allow for heating of the compressor crankcase. Failure to comply may result in damage and could cause premature failure of the system.

Indoor Blower — Set the thermostat function switch to COOLING and the fan switch to ON. Verify that the indoor blower is operating and that airflow is not restricted. Set the fan switch back to AUTO.

Blower Time Delay Relay (Select Models): A time delay relay may be provided with the unit and must be installed in the indoor section. The relay will keep the indoor blower running an additional 40 seconds for increased cooling efficiency after the outdoor unit shuts off. The relay has four terminals and one mounting hole.
Connect terminal "1" to load side of blower relay.
Connect terminal: "2" to terminal "R" of T'stat.
Connect terminal "3" to common terminal at blower relay or transformer. Connect terminal "4" to terminal "G" on T'stat.

Low-Pressure Switch (Select Models) — A low-pressure switch is factory-installed in select models only. If provided, this switch is located in the suction line internal to the outdoor unit. The switch is designed to protect the compressor from a loss of charge. Under normal conditions, the switch is closed. If the suction pressure falls below 5 psig, then the switch will open and de-energize the outdoor unit. The switch will close again once the suction pressure increases above 20 psig. Please note that the switch interrupts the thermostat inputs to the unit. Thus, when the switch opens and then closes, there will be a 5 minute short cycling delay before the outdoor unit will energize.

High-Pressure Switch — A high-pressure switch is factory-installed and located in the compressor discharge line internal to the outdoor unit. The switch is designed to de-energize the system when very high pressures occur during abnormal conditions. Under normal conditions, the switch is closed. If the discharge pressure rises above 575 psig, then the switch will open and de-energize the outdoor unit. The switch will close again once the discharge pressure decreases to 460 psig. Please note that the switch interrupts the thermostat inputs to the unit. Thus, when the switch opens and then closes, there will be a 5 minute short cycling delay before the outdoor unit will energize.

Short Cycle Protection — With the system operating in COOLING mode, note the setpoint temperature setting of the thermostat, and gradually raise the setpoint temperature until the outdoor unit and indoor blower de-energize. Immediately lower the setpoint temperature of the thermostat to its original setting and verify that the indoor blower is energized and that the outdoor unit remains de-energized. Verify that, after approximately 5 minutes, the outdoor unit energizes and that the temperature of the air supplied to the facility is cooler than ambient temperature.

Comfort Alert™ Diagnostics (Select Models) — The Comfort Alert™ diagnostics module facilitates troubleshooting heat pump and air conditioning system failures. This Comfort Alert™ module is designed only for single-phase systems with scroll compressors that have internal overload protection. By monitoring and analyzing data from the compressor and the thermostat demand, the module can detect the cause of electrical and system related failures without any sensors. A flashing LED indicator communicates the ALERT code and guides the service technician more quickly and accurately to the root cause of a problem.

NOTE: This module does not provide safety protection! The Comfort Alert™ module is a monitoring device and cannot control or shut down other devices.

LED Description (See Figure 2)
POWER LED (Green): indicates voltage is present at the power connection of the module.

ALERT LED (Yellow): communicates an abnormal system condition through a unique flash code. The ALERT LED will flash a number of times consecutively, pause and then repeat the process. The number of consecutive flashes, defined as the Flash Code, correlates to a particular abnormal condition. Detailed descriptions of specific ALERT Flash Codes are shown in Table 1 of this manual.

TRIP LED (Red): indicates there is a demand signal from the thermostat but no current to the compressor is detected by the module. The TRIP LED typically indicates the compressor protector is open or may indicate missing supply power to the compressor.

The scroll compressor's run (R), common (C) and start (S) wires are routed through the holes in the Comfort Alert™ module marked "R," "C" and "S."

24 VAC Power Wiring — The Comfort Alert™ module requires a constant nominal 24 VAC power supply. The wiring to the module's R and C terminals must be directly from the indoor unit or thermostat.

The Comfort Alert™ module requires a thermostat demand signal to operate properly.

NOTE: After the thermostat demand signal is connected, verify that 24 VAC across Y and C when demand is present.

TROUBLESHOOTING

Interpreting The Diagnostic LEDs – When an abnormal system condition occurs, the Comfort Alert™ module displays the appropriate ALERT and/or TRIP LED will flash a number of times consecutively, pause and then repeat the process. To identify a Flash Code number, count the number of consecutive flashes.

Every time the module powers up, the last ALERT Flash Code that occurred prior to shut down is displayed for one minute. The module will continue to display the LED until the condition returns to normal or if 24 VAC power is removed from the module.

Cooling — Gradually lower the thermostat temperature setpoint below the actual room temperature and observe that the outdoor unit and indoor blower energize. Feel the air being circulated by the indoor blower and verify that it is cooler than ambient temperature. Listen for any unusual noises. If present, locate and determine the source of the noise and correct as necessary.

Heating — Lower the thermostat setpoint temperature to the lowest obtainable setting and set the thermostat function switch to HEATING. The indoor blower and outdoor unit should stop running. After a minimum of five minutes, increase the setpoint temperature of the thermostat to the maximum setting. Verify that the outdoor unit and indoor blower have energized. Feel the air being circulated by the indoor blower and verify that it is warmer than ambient temperature. Listen

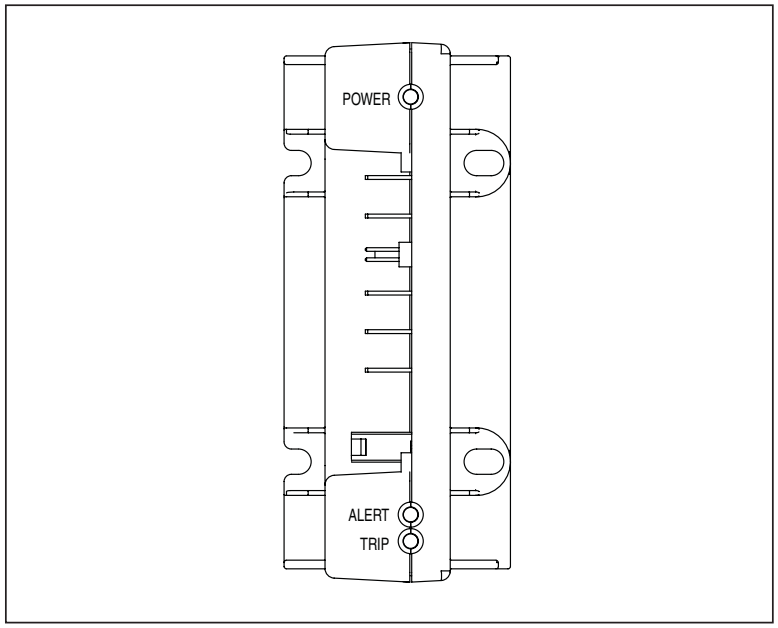


Figure 2. Comfort Alert™ Diagnostics Module

Status LED	Status LED Description	Status LED Troubleshooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Red "TRIP"	Thermostat demand signal Y is present, but the compressor is not running	1. Compressor protector is open 2. Outdoor unit power disconnect is open 3. Compressor circuit breaker or fuse(s) is open 4. Broken wire or connector is not making contact 5. Low pressure switch open if present in system 6. Compressor contactor has failed open
Yellow "ALERT" Flash Code 1	**Long Run Time** Compressor is running extremely long run cycles	1. Low refrigerant charge 2. Evaporator blower is not running 3. Evaporator coil is frozen 4. Faulty metering device 5. Condenser coil is dirty 6. Liquid line restriction (filter drier blocked if present in system) 7. Thermostat is malfunctioning 8. Comfort Alert Failure
Yellow "ALERT" Flash Code 2	**System Pressure Trip** Discharge or suction pressure out of limits or compressor overloaded	1. High head pressure 2. Condenser coil poor air circulation (dirty, blocked, damaged) 3. Condenser fan is not running 4. Return air duct has substantial leakage 5. If low pressure switch present in system, check Flash Code 1 information
Yellow "ALERT" Flash Code 3	**Short Cycling** Compressor is running only briefly	1. Thermostat demand signal is intermittent 2. Time delay relay or control board defective 3. If high pressure switch present go to Flash Code 2 information 4. If low pressure switch present go to Flash Code 1 information
Yellow "ALERT" Flash Code 4	**Locked Rotor**	1. Run capacitor has failed 2. Low line voltage (contact utility if voltage at disconnect is low) • Check wiring connections 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized • Measure compressor oil level
Yellow "ALERT" Flash Code 5	**Open Circuit**	1. Outdoor unit power disconnect is open 2. Compressor circuit breaker or fuse(s) is open 3. Compressor contactor has failed open • Check compressor contactor wiring and connectors • Check for compressor contactor failure (burned, pitted or open) • Check wiring and connectors between supply and compressor • Check for low pilot voltage at compressor contactor coil 4. High pressure switch is open and requires manual reset 5. Open circuit in compressor supply wiring or connections 6. Unusually long compressor protector reset time due to extreme ambient temperature 7. Compressor windings are damaged • Check compressor motor winding resistance
Yellow "ALERT" Flash Code 6	**Open Start Circuit** Current only in run circuit	1. Run capacitor has failed 2. Open circuit in compressor start wiring or connections • Check wiring and connectors between supply and the compressor "S" terminal 3. Compressor start winding is damaged • Check compressor motor winding resistance
Yellow "ALERT" Flash Code 7	**Open Run Circuit** Current only in start circuit	1. Open circuit in compressor run wiring or connections • Check wiring and connectors between supply and the compressor "R" terminal 2. Compressor run winding is damaged • Check compressor motor winding resistance
Yellow "ALERT" Flash Code 8	**Welded Contactor** Compressor always runs	1. Compressor contactor has failed closed 2. Thermostat demand signal not connected to module
Yellow "ALERT" Flash Code 9	**Low Voltage** Control circuit < 17VAC	1. Control circuit transformer is overloaded 2. Low line voltage (contact utility if voltage at disconnect is low) • Check wiring connections

- *Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.*
- *TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation.*

Table 1. Interpreting the Diagnostic LEDS

Miswired Module Indication	Recommended Troubleshooting Action
Green LED is not on, module does not power up	Determine if both R and C module terminals are connected. Verify voltage is present at module's R and C terminals. Review **24VAC Power Wiring** (page 4) for R and C wiring.
Green LED intermittent, module powers up only when compressor runs	Determine if R and Y terminals are wired in reverse. Verify module's R and C terminals have a constant source. Review **24VAC Power Wiring** (page 4) for R and C wiring.
TRIP LED is on but system and compressor check OK	Verify Y terminal is connected to 24VAC at contactor coil. Verify voltage at contactor coil falls below 0.5VAC when off. Verify 24 VAC is present across Y and C when thermostat demand signal is present. If not, R and C are reverse wired.
TRIP LED and ALERT LED flashing together	Verify R and C terminals are supplied with 19-28VAC.
ALERT Flash Code 3 (Compressor Short Cycling) displayed incorrectly	Verify Y terminal is connected to 24VAC at contactor coil. Verify voltage at contactor coil falls below 0.5VAC when off.
ALERT Flash Code 5, 6 or 7 (Open Circuit, Open Start Circuit or Open Run Circuit) displayed incorrectly	Check that compressor run and start wires are through module's current sensing holes. Verify Y terminal is connected to 24VAC at contactor coil. Verify voltage at contactor coil falls below 0.5VAC when off.
ALERT Flash Code 6 (Open Start Circuit) displayed for Code 7 (Open Run Circuit) or vice versa	Check that compressor run and start wires are routed through the correct module sensing holes.
ALERT Flash Code 8 (Welded Contactor) displayed incorrectly	Determine if module's Y terminal is connected. Verify Y terminal is connected to 24VAC at contactor coil. Verify 24VAC is present across Y and C when thermostat demand signal is present. If not, R and C are reverse wired. Verify voltage at contactor coil falls below 0.5VAC when off. Review **Thermostat Demand Wiring** (page 4) for Y and C wiring.

Table 2. Module Wiring Troubleshooting

for any unusual noises. If present, locate and determine the source of the noise and correct as necessary.

OUTDOOR THERMOSTAT (if supplied)

The outdoor thermostat prevents the electrical auxiliary heat (if used) from operating above a desired set point. Selection of the set point is determined from the building design heat load.

The thermostat is adjustable from 45°F to 0°F. The factory temperature setting is at 40°F.

Defrost Cycle Timer — The defrost cycle timer controls the time interval of the hot gas defrost after the defrost sensor closes. It is located in the lower left corner of the defrost control board. Three interval settings are available: 30 minutes, 60 minutes, and 90 minutes. Time setting selection is dependent on the climate where the unit is being installed.

Example 1. Dry climate of Southern Arizona. A 90 minute setting is recommended.

Example 2. Moist climate of Seattle, Washington. A 30 minute setting is recommended.

To set the cycle timer, place the timing pin on the defrost control board to the desired time interval post.

Note: All units are shipped from the factory with the default time setting of 30 minutes. Maximum heating performance can be achieved by setting the time to 90 minutes.

Defrost Test Procedure

1. Terminals "R"-"C" must have 18-30v present between them in order for time delay and defrost sequences to be initiated.

2. With compressor running in heat mode, first jump the "T2"-"DFT" test pins. This will indicate to board that defrost T-stat is closed. Defrost T-stat closes at 32°, opens at 68°.

3. Next jump the "Test" pin to "C" on terminal strip. This will initiate defrost test in 5, 10 or 15 seconds (This is determined by 30, 60 or 90 minutes defrost pin settings). Factory setting will be 30 minutes.

4. When the reversing valve shifts to the defrost mode, quickly remove jumper from "Test"-"C". If the jumper is not removed within a 5 second period, the defrost test will terminate. Unit will continue to stay in defrost mode Until :
   A) Board recognizes that defrost sensor has reached 68° and opened or
   B) "T2"-"DFT" jumper is removed or
   C) 10 minutes have elapsed (board override)

If the above steps will not initiate a defrost, replace the defrost board.

Anti Short Cycle Timer Test

The 5 minute time delay feature can be bypassed or shortened to 1 second by jumping the "Test" to "C" terminal.

Note: If jumper is left on the "Test" to "common" pins permanently, the defrost cycle will become inoperable.

Optional Equipment — A functional checkout should be performed in accordance with the checkout procedures supplied with the equipment.

Adjustment of Refrigerant Charge:

⚠ CAUTION:

Split system heat pump equipment contains liquid and gaseous refrigerant under pressure. Adjustment of refrigerant charge should only be attempted by qualified, trained personnel thoroughly familiar with the equipment. Under no circumstances should the homeowner attempt to install and/or service this equipment. Failure to comply with this warning could result in equipment damage, personal injury, or death.

NOTE: The following Refrigerant Charging Charts are applicable to listed assemblies of equipment and at listed airflows for the indoor coil. Assemblies of indoor coils and outdoor units not listed are not recommended.

13 SEER SPLIT SYSTEM HEAT PUMP ORIFICE USAGE

Model Number	Restrictor Bore Size (in.)		System Charge R-22 (oz.)
	Indoor	Outdoor	
1-1/2 Ton	.050	.042	112
2 Ton	.055	.045	138
2-1/2 Ton	.065	.048	145
3 Ton	.073	.052	168
3-1/2 Ton	.077	.055	243
4 Ton	.080	.058	248
5 Ton	.089	.062	248

Refrigerant Charging Charts for Cooling Mode of Operation
13 SEER Split System Cooling Charts

REFRIGERANT CHARGING CHARTS LEGEND FOR COOLING/HEATING MODES OF OPERATION

*Note: All pressures are listed in psig. and all temperatures in deg. F.

- Shaded boxes indicate flooded conditions

- Rated design values. Suction Pressure will be lower than design value if indoor air flow, entering dry bulb, or entering wet bulb temperatures are lower than design.

- Discharge temperatures greater than charted values indicates a refrigerant undercharge.

018K	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
133																
135	232	89														
137	233	100	251	99												
139	235	112	253	109	270	107										
141	236	120	255	119	273	116	291	116	308	118						
143	237	137	258	128	277	120	294	122	312	125	329	124				
145			259	142	279	133	299	125	315	134	333	131	350	130		
147					281	147	301	137	320	137	337	138	354	136	371	136
149							303	152	322	146	342	141	359	142	376	141
151									325	157	344	151	364	147	381	147
153											347	161	366	156	385	152
155													368	166	388	161
157															390	170
159																

Refrigerant Charging Charts for Cooling Mode of Operation

13 SEER Split System Cooling Charts

024K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
133																
135	247	144														
137	248	156	269	142												
139	250	167	271	152	291	140										
141	248	200	274	162	294	149	312	141	329	136						
143	249	217	273	187	294	164	315	147	333	144	349	137				
145			274	201	296	178	316	158	336	152	353	144	369	138		
147					297	191	318	171	338	161	357	150	373	144	389	140
149							320	185	341	170	360	158	378	150	393	145
151									343	181	362	168	382	157	398	151
153											365	178	384	166	403	156
155													387	175	406	165
157															408	174
159																

030K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
130																
132	243	120														
134	245	132	265	123												
136	246	143	267	133	287	125										
138	246	166	270	143	290	133	309	129	327	127						
140	246	183	270	161	292	143	312	135	330	134	348	129				
142			271	175	294	157	315	142	334	142	352	136	369	132		
144					295	171	317	154	338	148	356	143	373	138	390	136
146							319	168	340	157	361	148	378	145	395	142
148									342	167	363	157	383	149	400	148
150											365	167	386	158	406	151
152													388	168	408	160
154															411	169
156																

Refrigerant Charging Charts for Cooling Mode of Operation
13 SEER Split System Cooling Charts

036K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
131																
133	250	91														
135	251	103	270	102												
137	252	114	272	112	290	110										
139	254	124	274	122	293	118	312	118	330	120						
141	254	141	276	132	297	123	315	124	334	127	352	126				
143			277	146	299	137	319	128	338	136	356	133	374	132		
145					300	151	321	141	342	141	360	139	379	138	397	138
147							323	155	344	149	364	145	383	144	401	143
149									346	160	367	155	387	151	406	149
151											369	165	389	160	410	156
153													392	169	412	165
155															415	174
157																

042K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
132																
134	241	132														
136	242	144	262	133												
138	243	155	264	143	283	132										
140	243	180	266	152	286	141	304	135	320	131						
142	243	197	267	172	288	152	307	141	324	138	340	133				
144			268	186	289	165	310	148	328	147	344	139	360	134		
146					291	179	312	160	332	153	349	146	365	141	380	137
148							314	175	334	161	353	150	369	147	385	143
150									336	172	356	160	375	150	389	149
152											358	170	377	160	397	150
154													380	169	399	159
156															402	168
158																

Refrigerant Charging Charts for Cooling Mode of Operation

13 SEER Split System Cooling Charts

048K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
130																
132	246	144														
134	248	155	269	143												
136	249	166	271	153	290	142										
138	248	196	273	163	293	151	311	144	329	140						
140	249	213	272	185	294	164	315	150	332	147	349	141				
142			274	199	296	178	317	159	336	155	353	148	369	142		
144					297	191	318	172	339	163	357	154	374	148	389	145
146							320	186	341	172	361	160	378	155	394	151
148									343	183	363	170	383	160	399	156
150											365	180	385	169	404	160
152													387	179	407	169
154															409	178
156																

060K

	OUTDOOR TEMPERATURE (deg. F)															
	70		75		80		85		90		95		100		105	
Suc. Press.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
124																
126	260	140														
128	261	151	282	142												
130	263	162	284	152	304	144										
132	262	186	287	162	307	153	327	148	345	146						
134	263	202	287	181	309	164	330	154	349	154	367	149				
136			288	195	311	177	333	162	353	162	371	156	389	152		
138					312	191	334	175	356	169	375	162	393	158	411	156
140							336	189	358	178	379	168	397	164	415	161
142									360	188	381	178	402	170	420	167
144											383	188	404	179	425	172
146													407	189	427	181
148															430	190
150																

Refrigerant Charging Charts for Heating Mode of Operation
13 SEER Split System Heating Charts

018K	OUTDOOR TEMPERATURE (DEG. F)																		
0			10			20			30			40			50			60		
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
37	212	108	52	232	111	66	252	114	81	273	117	96	285	125	114	311	139	131	338	153
38	219	106	53	238	109	67	257	112	82	276	115	97	292	123	115	318	135	132	345	147
39	226	104	54	244	107	68	262	110	83	280	113	98	299	120	116	325	130	133	352	141
40	233	102	55	250	105	69	267	108	84	284	111	99	306	117	117	332	126	134	359	134
41	240	100	56	256	103	70	271	106	85	287	109	100	313	114	118	339	121	135	366	128
42	247	98	57	261	101	71	276	104	86	291	107	101	320	111	119	346	117	136	373	122
43	254	96	58	267	99	72	281	102	87	295	105	102	327	108	120	353	112	137	380	116

024K	OUTDOOR TEMPERATURE (DEG. F)																		
0			10			20			30			40			50			60		
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
37	211	111	52	237	115	66	263	119	81	289	123	97	306	132	114	337	147	131	367	162
38	218	109	53	243	113	67	268	117	82	293	121	98	313	129	115	344	142	132	374	156
39	225	107	54	249	111	68	273	115	83	297	119	99	320	126	116	351	138	133	381	149
40	232	105	55	255	109	69	277	113	84	300	117	100	327	124	117	358	133	134	388	143
41	239	103	56	261	107	70	282	111	85	304	115	101	334	121	118	365	129	135	395	137
42	246	101	57	266	105	71	287	109	86	308	113	102	341	118	119	372	124	136	402	131
43	253	99	58	272	103	72	292	107	87	311	111	103	348	115	120	379	120	137	409	125

Refrigerant Charging Charts for Heating Mode of Operation
13 SEER Split System Heating Charts

030K	OUTDOOR TEMPERATURE (DEG. F)																			
	0			10			20			30			40			50			60	
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
35	209	105	49	238	114	63	267	123	77	296	131	92	315	146	109	347	167	126	380	189
36	216	103	50	244	112	64	272	121	78	299	129	93	322	143	110	354	163	127	387	182
37	223	101	51	250	110	65	276	119	79	303	127	94	329	140	111	361	158	128	394	176
38	230	99	52	256	108	66	281	117	80	307	125	95	336	138	112	368	154	129	401	170
39	237	97	53	261	106	67	286	115	81	310	123	96	343	135	113	375	149	130	408	164
40	244	95	54	267	104	68	291	113	82	314	121	97	350	132	114	382	145	131	415	158
41	251	93	55	273	102	69	296	111	83	318	119	98	357	129	115	389	140	132	422	152

036K	OUTDOOR TEMPERATURE (DEG. F)																			
	0			10			20			30			40			50			60	
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
34	204	108	49	238	116	64	271	125	79	305	134	95	329	148	111	367	167	128	405	186
35	211	106	50	244	114	65	276	123	80	309	132	96	336	145	112	374	162	129	412	180
36	218	104	51	249	112	66	281	121	81	312	130	97	343	142	113	381	158	130	419	174
37	225	102	52	255	110	67	286	119	82	316	128	98	350	139	114	388	153	131	426	167
38	232	100	53	261	108	68	290	117	83	320	126	99	357	136	115	395	149	132	433	161
39	239	98	54	267	106	69	295	115	84	323	124	100	364	133	116	402	144	133	440	155
40	246	96	55	273	104	70	300	113	85	327	122	101	371	131	117	409	140	134	447	149

Refrigerant Charging Charts for Heating Mode of Operation
13 SEER Split System Heating Charts

042K	OUTDOOR TEMPERATURE (DEG. F)																			
	0			10			20			30			40			50			60	
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
36	212	106	50	235	114	64	259	123	78	282	131	93	297	144	109	328	162	125	358	181
37	219	104	51	241	112	65	263	121	79	286	129	94	304	141	110	335	158	126	365	175
38	226	102	52	247	110	66	268	119	80	289	127	95	311	138	111	342	153	127	372	168
39	233	100	53	253	108	67	273	117	81	293	125	96	318	136	112	349	149	128	379	162
40	240	98	54	259	106	68	278	115	82	297	123	97	325	133	113	356	145	129	386	156
41	247	96	55	265	104	69	283	113	83	300	121	98	332	130	114	363	140	130	393	150
42	254	94	56	271	102	70	287	111	84	304	119	99	339	127	115	370	136	131	400	144

048K	OUTDOOR TEMPERATURE (DEG. F)																			
	0			10			20			30			40			50			60	
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
35	218	133	49	246	142	62	274	151	75	302	160	88	317	169	100	343	180	112	369	191
36	225	131	50	252	140	63	279	149	76	306	158	89	324	167	101	350	176	113	376	185
37	232	129	51	258	138	64	283	147	77	309	156	90	331	164	102	357	171	114	383	179
38	239	127	52	263	136	65	288	145	78	313	154	91	338	161	103	364	167	115	390	173
39	246	125	53	269	134	66	293	143	79	317	152	92	345	158	104	371	162	116	397	166
40	253	123	54	275	132	67	298	141	80	320	150	93	352	155	105	378	158	117	404	160
41	260	121	55	281	130	68	303	139	81	324	148	94	359	152	106	385	153	118	411	154

Refrigerant Charging Charts for Heating Mode of Operation
13 SEER Split System Heating Charts

060K	OUTDOOR TEMPERATURE (DEG. F)																			
0			10			20			30			40			50			60		
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.
31	223	131	44	253	143	57	283	155	70	313	166	82	329	179	95	355	193	107	381	206
32	230	129	45	259	141	58	288	153	71	316	164	83	336	176	96	362	188	108	388	200
33	237	127	46	265	139	59	292	151	72	320	162	84	343	173	97	369	184	109	395	194
34	244	125	47	271	137	60	297	149	73	324	160	85	350	171	98	376	179	110	402	188
35	251	123	48	277	135	61	302	147	74	327	158	86	357	168	99	383	175	111	409	181
36	258	121	49	282	133	62	307	145	75	331	156	87	364	165	100	390	170	112	416	175
37	265	119	50	288	131	63	312	143	76	335	154	88	371	162	101	397	166	113	423	169

INSTALLER: PLEASE LEAVE THESE INSTALLATION INSTRUCTIONS WITH THE HOMEOWNER.

7084100

We Encourage Professionalism

Through Technician Certification by NATE

7084100

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